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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/682,399	10/09/2003	Joon Chang	AUS920030298US1	8359

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EXAMINER

TRUONG, LOAN

ART UNIT	PAPER NUMBER
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2114

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/682,399	Applicant(s) CHANG ET AL.	
	Examiner LOAN TRUONG	Art Unit 2114	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10,21 and 24-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10,21 and 24-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the amendment filed November 28, 2006 in application 10/682,399.
2. Examiner acknowledged that claims 1-9, 11-20 and 22-23 are previously cancel and claims 10 and 21 are amended and claims 24-39 have been added.

Response to Arguments

3. Applicant's arguments with respect to claims 10 and 21 have been considered but are moot in view of the new ground(s) of rejection.

In regard to the amended limitation of the Write I/O request is to a "pre-existing" block of data is indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Examiner interpreted the pre-existing block of data as a storage device with null or empty data values written from the manufacture or a block of data written in the previous write cycle. In either case, the amended limitation of "pre-existing" block of data doesn't particularly point out or distinct the claim from the cited reference.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
4. Claims 10, 21, 24-26, 28-34 and 36-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakuta et al. (US 6,243,824) in further view of Yang et al. (US 2004/0059855) in further view of Matze et al. (US 5,907,672).

In regard to claim 10, Kakuta et al. teach a method of handling Write input/output (I/O) requests during a backup operation on at least one storage device, comprising:

Receiving a Write I/O request for performing a Write I/O operation to a logical volume, wherein at least a portion of the logical volume resides on the at least one storage device (*write operation received by a group of data disks, fig. 2, 6a, 6b, col. 4 lines 35-67 and col. 5 lines 1-10*);

Determining if a backup operation is being performed on the at least one storage device (*backup-in-process flag is ON, fig. 13, 134*); and

Suspending the Write I/O operation in a logical volume manager until after the backup operation is completed if it is determined that the backup operation is being performed (*write data item is saved in storing disk 9 and transfer to DCU (data control unit) after backup operation, fig. 4, col. 8 lines 23-31 and lines 46-49*), wherein Write I/O operations to at least one

other logical volume are not suspended during the backup operation (*write request issued to data disk 6a only subdata item for disk 6a is written on the write data storing disk 9, fig. 7, 77a, 78b, col. 10 lines 15-20*);

Kakuta et al. does not teach the method of logging the Write I/O request in a file system log indicating that the Write I/O request is being submitted to the at least one storage device and wherein the Write I/O request is suspended only if the Write I/O request is to a pre-existing block of data that is subject to the backup operation.

Yang et al. teach the method of the interrupt handler receiving the write request and register the write request on the queue (*paragraph 0029*).

It would have been obvious to modify the method of Kakuta et al. by adding Yang et al. method of handling write requests. A person of ordinary skill in the art at the time of applicant's invention would have been motivated to make the modification because it would not disrupt the integrity of shared resources (*paragraph 0011*).

Kakuta et al. and Yang et al. does not teach the method of logging wherein the Write I/O request is suspended only if the Write I/O request is to a pre-existing block of data that is subject to the backup operation.

Matze et al. teach the method for backing up computer disk volumes with error remapping of flawed memory addresses by implementing write suspension only for the point at which the logical sector range of the requested write instead of suspending all writes to the volume during the entire backup process (*col. 13 lines 22-27*).

It would have been obvious to modify the method of Kakuta et al. and Yang et al. by adding Matze et al. method for backing up computer disk volumes. A person of

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ordinary skill in the art at the time of applicant's invention would have been motivated to make the modification because it would guaranteed that the backup image is identical to the disk image at the time when the backup started but the system can resume somewhat normal operation before the operation is complete (*col. 13 lines 27-30*).

In regard to claim 21 Kakuta et al. teach a computer program product in a computer readable medium for handling Write input/output (I/O) requests during a backup operation on at least one storage device, comprising:

First instructions for receiving a Write I/O request for performing a Write I/O operation to a logical volume, wherein at least a portion of the logical volume resides on the at least one storage device (*write operation received by a group of data disks, fig. 2, 6a, 6b, col. 4 lines 35-67 and col. 5 lines 1-10*);

Third instructions for determining if a backup operation is being performed on the at least one storage device (*backup-in-process flag is ON, fig. 13, 134*); and

Fourth instructions for suspending the Write I/O operation in a logical volume manager until after the backup operation is completed if it is determined that the backup operation is being performed (*write data item is saved in storing disk 9 and transfer to DCU (data control unit) after backup operation, fig. 4, col. 8 lines 23-31 and lines 46-49*), wherein Write I/O operations to at least one other logical volume are not suspended during the backup operation (*write request issued to data disk 6a only subdata item for disk 6a is written on the write data storing disk 9, fig. 7, 77a, 78b, col. 10 lines 15-20*);

Kakuta et al. does not teach the program product second instruction of logging the Write I/O request in a file system log indicating that the Write I/O request is being submitted to the at least one storage device and wherein the Write I/O request is suspended only if the Write I/O request is to a pre-existing block of data that is subject to the backup operation.

Yang et al. teach the instruction of the interrupt handler receiving the write request and register the write request on the queue (*paragraph 0029*).

Refer to claim 10 for motivational statement.

Kakuta et al. and Yang et al. does not teach the program product wherein the Write I/O request is suspended only if the Write I/O request is to a pre-existing block of data that is subject to the backup operation.

Matze et al. teach the method for backing up computer disk volumes with error remapping of flawed memory addresses by implementing write suspension only for the point at which the logical sector range of the requested write instead of suspending all writes to the volume during the entire backup process (*col. 13 lines 22-27*).

Refer to claim 10 for motivation statement.

In regard to claim 24, Kakuta et al. disclosed the method of claim 10, wherein suspending the Write I/O operation includes:

Storing the Write I/O request in a hold queue in the logical volume manager, wherein the Write I/O request is not forwarded to the at least one storage device while the Write I/O request

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is in the hold queue (*I/O command issued during a backup operation is saved in the write data storing disk, fig. 4, 9, col. 8 lines 25-31*).

In regard to claim 25, Kakuta et al. disclosed the method of claim 10, wherein determining if a backup operation is being performed includes:

Determining if a backup flag is set in a logical volume manager (*backup-in-progress flag, fig. 13, 134*).

In regard to claim 26, Kakuta et al. disclosed the method of claim 25, wherein the backup flag is set in response to receipt of a message from a backup application indicating that a backup operation has been initiated (*issue backup command and set backup-in-progress flag to on, fig. 12, 124, 126*).

In regard to claim 28, Kakuta et al. disclosed the method of claim 24, further comprising:

Receiving a message indicating that the backup operation is complete (*set backup-in-process flag to off, fig. 12, 130*); and

Releasing the Write I/O request from the hold queue in response to receiving the message (*when the write data item is stored on the write data storing disk, after the backup operation is complete the data item saved on the disk during backup operation is transferred to the DCU, col. 8 lines 45-49*); and

Submitting the Write I/O request to the at least one storage device (*when the backup operation is finished on the data disk 6a, the associated subdata item is immediately transferred from the disk 9 onto data disk 6a, fig. 5, col. 10 lines 15-20*).

In regard to claim 29, Kakuta et al. does not explicitly teach the method of claim 24, wherein the hold queue is a linked list in which Write I/O requests are stored in an order in which they are received by the logical volume manager.

Yang et al. teach the method of the write request queue or linked list holding the write requests will be serviced by a servicing schedule in the order of a first in, first out FIFO mechanism.

Refer to claim 10 for motivational statement.

In regard to claim 30, Kakuta et al. does not explicitly teach the method of claim 28, wherein the Write I/O requests in the hold queue are released from the hold queue in an order in which they were received by the logical volume manager.

Yang et al. teach the method of the write request queue or linked list holding the write requests will be serviced by a servicing schedule in the order of a first in, first out FIFO mechanism.

Refer to claim 10 for motivational statement.

In regard to claim 31, Kakuta et al. disclosed the method of claim 28, further comprising:

Updating file system metadata based on the file system log only after the backup operation is complete and the Write I/O operation is released from the hold queue (*after the backup operation is completed for all data disks, the write data item saved on the disk during the backup operation is transferred to the DCU (data control unit) to load the subdivided data items and the ECCs on the data disks and the ECC disk in a similar manner to the employed in an ordinary write processing, col. 8 lines 45-53*).

In regard to claim 32, Kakuta et al. disclosed the computer program product of claim 21, wherein the third instructions for suspending the Write I/O operation include:

Instructions for storing the Write I/O request in a hold queue in the logical volume manager, wherein the Write I/O request is not forwarded to the at least one storage device while the Write I/O request is in the hold queue (*I/O command issued during a backup operation is saved in the write data storing disk, fig. 4, 9, col. 8 lines 25-31*).

In regard to claim 33, Kakuta et al. disclosed the computer program product of claim 21, wherein the second instructions for determining if a backup operation is being performed included:

Instructions for determining if a backup flag is set in a logical volume manager (*backup-in-progress flag, fig. 13, 134*).

In regard to claim 34, Kakuta et al. disclosed the computer program product of claim 33, wherein the backup flag is set in response to receipt of a message from a backup application

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indicating that a backup operation has been initiated (*issue backup command and set backup-in-progress flag to on, fig. 12, 124, 126*).

In regard to claim 36, Kakuta et al. disclosed the computer program product of claim 32, further comprising:

Fourth instructions for receiving a message indicating that the backup operation is complete (*set backup-in-process flag to off, fig. 12, 130*); and

Fifth instructions for releasing the Write I/O request from the hold queue in response to receiving the message (*when the write data item is stored on the write data storing disk, after the backup operation is complete the data item saved on the disk during backup operation is transferred to the DCU, col. 8 lines 45-49*); and

Sixth instructions for submitting the Write I/O request to the at least one storage device (*when the backup operation is finished on the data disk 6a, the associated subdata item is immediately transferred from the disk 9 onto data disk 6a, fig. 5, col. 10 lines 15-20*).

In regard to claim 37, Kakuta et al. does not explicitly teach the computer program product of claim 32, wherein the hold queue is a linked list in which Write I/O requests are stored in an order in which they are received by the logical volume manager.

Yang et al. teach the method of the write request queue or linked list holding the write requests will be serviced by a servicing schedule in the order of a first in, first out FIFO mechanism.

Refer to claim 10 for motivational statement.

In regard to claim 38, Kakuta et al. does not explicitly teach the computer program product of claim 36, wherein the Write I/O requests in the hold queue are released from the hold queue in an order in which they were received by the logical volume manager.

Yang et al. teach the method of the write request queue or linked list holding the write requests will be serviced by a servicing schedule in the order of a first in, first out FIFO mechanism.

Refer to claim 10 for motivational statement.

In regard to claim 39, Kakuta et al. disclosed the computer program product of claim 36, further comprising:

Seventh instructions for updating file system metadata based on the file system log only after the backup operation is complete and the write I/O operation is released from the hold queue (*after the backup operation is completed for all data disks, the write data item saved on the disk during the backup operation is transferred to the DCU (data control unit) to load the subdivided data items and the ECCs on the data disks and the ECC disk in a similar manner to the employed in an ordinary write processing, col. 8 lines 45-53*).

5. Claims 27 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakuta et al. (US 6,243,824) in further view of Yang et al. (US 2004/0059855) in further view of Matze et al. (US 5,907,672) in further view of Padovano (US 2002/0156984).

In regard to claim 27, Kakuta et al., Yang et al. and Matze et al. does not explicitly teach the method of claim 10, wherein the backup operation is a point-in-time backup operation.

Padovano teach the method of accessing a storage area network as network attached storage by implementing point-in-time copies of the data (*paragraph 0008*).

It would have been obvious to modify the method of Kakuta et al., Yang et al. and Matze et al. by adding Padovano method of accessing a storage area network as network attached storage. A person of ordinary skill in the art at the time of applicant's invention would have been motivated to make the modification because it would provide storage management functions for storage devices attached to a network (*paragraph 0008*).

In regard to claim 35, Kakuta et al., Yang et al. and Matze et al. does not explicitly teach the computer program product of claim 21, wherein the backup operation is a point-in-time backup operation.

Padovano teach the method of accessing a storage area network as network attached storage by implementing point-in-time copies of the data (*paragraph 0008*).

It would have been obvious to modify the method of Kakuta et al., Yang et al. and Matze et al. by adding Padovano method of accessing a storage area network as network attached storage. A person of ordinary skill in the art at the time of applicant's invention would have been motivated to make the modification because it would provide storage management functions for storage devices attached to a network (*paragraph 0008*).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO 892.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LOAN TRUONG whose telephone number is (571) 272-2572. The examiner can normally be reached on M-F from 8am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, SCOTT BADERMAN can be reached on (571) 272-3644. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Loan Truong
Patent Examiner
Art Unit: 2114



SCOTT BADERMAN
SUPERVISORY PATENT EXAMINER